

N60508.AR.000191  
NAS WHITING FIELD  
5090.3a

FINAL FEASIBILITY STUDY ADDENDUM FOR SITE 15 NAS WHITING FIELD FL  
8/10/2006  
TETRA TECH NUS

# **C**omprehensive **L**ong-term **E**nvironmental **A**ction **N**avy

CONTRACT NUMBER N62467-94-D-0888



Rev. 1  
08/10/06

## **Feasibility Study Addendum for OU 14, Site 15, Southwest Landfill Surface and Subsurface Soil**

**Naval Air Station Whiting Field  
Milton, Florida  
USEPA ID No. FL2170023244**

**Contract Task Order 0369**

**August 2006**



**Southeast**

**2155 Eagle Drive**

**North Charleston, South Carolina 29406**

**FEASIBILITY STUDY ADDENDUM  
FOR  
OU 14, SITE 15, SOUTHWEST LANDFILL  
SURFACE AND SUBSURFACE SOIL**

**NAVAL AIR STATION WHITING FIELD  
MILTON, FLORIDA**

**USEPA ID No. FL2170023244**

**Submitted to:  
Naval Facilities Engineering Command  
Southeast  
2155 Eagle Drive  
North Charleston, South Carolina 29406**

**Submitted by:  
Tetra Tech NUS, Inc.  
661 Andersen Drive  
Foster Plaza 7  
Pittsburgh, Pennsylvania 15220**

**CONTRACT NO. N62467-94-D-0888  
CONTRACT TASK ORDER 0369**

**AUGUST 2006**

**PREPARED UNDER THE SUPERVISION OF:**

**APPROVED FOR SUBMITTAL BY:**

---

**MICHAEL O. JAYNES, P.E.  
TASK ORDER MANAGER  
TETRA TECH NUS, INC.  
TALLAHASSEE, FLORIDA**

---

**DEBRA M. HUMBERT  
PROGRAM MANAGER  
TETRA TECH NUS, INC.  
PITTSBURGH, PENNSYLVANIA**



This document, *Feasibility Study Addendum for Site 15, Southwest Landfill, Surface and Subsurface Soil, Naval Air Station Whiting Field, Milton, Florida*, has been prepared under the direction of a Florida Registered Professional Engineer. The work and professional opinions rendered in this report were conducted or developed in accordance with commonly accepted procedures consistent with applicable standards of practice. This document was prepared for Naval Air Station Whiting Field, Milton, Florida and should not be construed to apply to any other site.

Tetra Tech NUS, Inc.  
3360 Capital Circle N.E., Suite B  
Tallahassee, FL 32308  
Certificate of Authorization No. 7988

---

Michael O. Jaynes, P.E.  
Professional Engineer  
State of Florida License No. 55441  
Expires: February 28, 2007

## TABLE OF CONTENTS

<b><u>SECTION</u></b>	<b><u>PAGE</u></b>
<b>PROFESSIONAL ENGINEER CERTIFICATION .....</b>	<b>iii</b>
<b>ACRONYMS .....</b>	<b>vi</b>
<b>1.0 INTRODUCTION.....</b>	<b>1-1</b>
1.1 PURPOSE.....	1-2
1.2 REPORT ORGANIZATION.....	1-2
<b>2.0 ENVIRONMENTAL CONDITIONS .....</b>	<b>2-1</b>
2.1 NATURE AND EXTENT OF CONTAMINATION .....	2-1
2.2 REVISED HUMAN HEALTH RISK ASSESSMENT RESULTS .....	2-1
2.2.1 Selection of Human Health COPCs .....	2-3
2.2.2 Risk Characterization Summary .....	2-4
2.2.3 Evaluation of Results .....	2-5
<b>3.0 REMEDIAL ACTION OBJECTIVES.....</b>	<b>3-1</b>
3.1 REVISED AND CLEANUP GOALS .....	3-2
3.2 REVISED CONSTITUENTS OF CONCERN .....	3-2
3.3 REVISED AREAS AND VOLUMES OF SOIL REQUIRING REMEDIAL ACTION.....	3-5
<b>4.0 AMENDED DESCRIPTION AND EVALUATION OF REMEDIAL ALTERNATIVES .....</b>	<b>4-1</b>
4.1 AMENDED DESCRIPTION OF ALTERNATIVES .....	4-1
4.2 AMENDED EVALUTATION OF ALTERNATIVES .....	4-1
4.2.1 Overall Protection of Human Health and the Environment.....	4-1
4.2.2 Compliance with ARARs .....	4-1
4.2.3 Long-Term Effectiveness and Permanence .....	4-1
4.2.4 Reduction of Mobility, Toxicity, or Volume through Treatment .....	4-5
4.2.5 Short-Term Effectiveness .....	4-5
4.2.6 Implementability .....	4-5
4.2.7 Cost.....	4-5
4.2.8 State Acceptance .....	4-5
4.2.9 Community Acceptance .....	4-5
4.3 EVALUATION SUMMARY .....	4-5
<b>REFERENCES.....</b>	<b>R-1</b>

## **APPENDIX**

### **A REMEDIAL ALTERNATIVE COST ESTIMATES**

## TABLES

<b><u>NUMBER</u></b>	<b><u>PAGE</u></b>
3-1 Determination of Revised Cleanup Goals at Site 15 .....	3-3
3-2 Revised Constituent of Concern Evaluation, Subsurface Soil.....	3-4
4-1 Comparison of Original FS and FSA Description of Soil Remedial Alternatives .....	4-2
4-2 Summary of Comparative Impact of Changes in COCs on Evaluation of Remedial Alternatives .....	4-3

**TABLE OF CONTENTS (Continued)**

**FIGURES**

<b><u>NUMBER</u></b>	<b><u>PAGE</u></b>
2-1      Location of Soil Samples, Site 15 .....	2-2

## ACRONYMS

ABB-ES	ABB Environmental Services, Inc.
ARARs	Applicable or Relevant and Appropriate Requirements
bls	below land surface
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CG	Cleanup Goal
COC	constituents of concern
COPCs	constituent of potential concern
EE	Envirodyne Engineers, Inc.
EPC	exposure point concentration
F.A.C.	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FS	Feasibility Study
FSA	Feasibility Study Addendum
ft	foot/feet
GIR	General Information Report
HHRA	Human Health Risk Assessment
HI	Hazard Index
HLA	Harding Lawson and Associates
HQ	Hazard Quotient
IAS	Initial Assessment Study
ILCR	Incremental Lifetime Cancer Risk
LUC	Land Use Controls
LUCIP	Land Use Controls Implementation Plan
mg/kg	milligrams per kilogram
NAS	Naval Air Station
NPW	net present worth
PCB	Polychlorinated Biphenyls
PRG	Preliminary Remediation Goal
RAGS	Risk Assessment Guidance for Superfund
RAOs	Remedial Action Objectives
RBC	Risk-Based Concentration
RD	Remedial Design
RI	Remedial Investigation
ROD	Record of Decision

## ACRONYMS (Continued)

SCTL	Soil Cleanup Target Level
NAVFAC SE	Naval Facilities Engineering Command Southeast
SVOC	semi-volatile organic compound
TBC	To Be Considered
TtNUS	Tetra Tech NUS, Inc.
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound



## 1.0 INTRODUCTION

Tetra Tech NUS, Inc. (TtNUS), under contract N62467-94-D-0888 to the Department of the Navy, Naval Facilities Engineering Command Southeast (NAVFAC SE), is submitting this Feasibility Study Addendum (FSA) to address changes at Site 15, Southwest Landfill, since the original Feasibility Study (FS) was submitted in March 2001 [Harding Lawson and Associates (HLA), 2001]. The original FS addressed surface and subsurface soils at Naval Air Station (NAS) Whiting Field, Site 15.

The changed conditions at Site 15 addressed in this FSA include:

- Arsenic, originally identified as a constituent of concern (COC) at Site 15, was determined to be naturally occurring at the site, based on additional review of inorganic data from the facility and surrounding area in April 2001 [Letter from Jim Cason, Florida Department of Environmental Protection (FDEP), 2001]. Because the identified human health risks associated with arsenic are now considered to be due to naturally occurring levels, arsenic will not be retained as a COC and remediation of arsenic in surface soil is not required at Site 15.
- Over the course of the investigations at this site, United States Environmental Protection Agency (USEPA) Region IV changed its screening criteria for evaluation of hazardous waste-related sites from USEPA Region III Risk-Based Concentrations (RBCs) to USEPA Region IX Preliminary Remediation Goals (PRGs) (USEPA, 2002). Therefore, analytical results are now compared to the USEPA Region IX PRGs and FDEP Soil Cleanup Target Levels (SCTLs) (FDEP, 2005).
- The individual metal constituents, aluminum, iron, manganese, and vanadium, have no direct evidence of site-related use at Site 15 and the process and procedures at this site did not likely contribute to the presence of these inorganic analytes in surface soil. Additionally, the site-specific values for these inorganics are within the typical range of levels found at NAS Whiting Field. The Technical Memorandum "Inorganics in Soil at NAS Whiting Field" (TtNUS, 2005) presents the technical basis for this determination. Considering the information presented above, aluminum, iron, manganese and vanadium are not considered constituents of potential concern (COPCs) for Site 15 surface and subsurface soils.

## 1.1 PURPOSE

The purpose of this FSA is to evaluate the impact of the changes discussed above on the remedial alternatives for surface and subsurface soil at Site 15 at NAS Whiting Field. Remedial Alternatives were developed in the original FS (HLA, 2001).

The specific items to be evaluated include:

- Soil screening criteria changed to USEPA Region IX PRGs
- Revised Human Health Risk Assessment (HHRA) and COC selection

The revised HHRA and methodology used to evaluate constituent concentrations in surface and subsurface soil at Site 15 at NAS Whiting Field is detailed in the *Risk Assessment Re-evaluation of Soils at Sites 9, 10, 11, 12, 13, 14, 15, 16, 17, and 18, NAS Whiting Field, Milton, Florida* (TtNUS, 2004). These sites were previously evaluated in 1999 and 2000 using the methodology described in the NAS Whiting Field General Information Report (GIR) [ABB Environmental Services, Inc. (ABB-ES), January 1998]. The risk assessments for these sites were re-evaluated and updated to assure they are in compliance with current USEPA, State of Florida, and Navy guidance/methods and to update any risk assessment results with potential impact on risk management decisions for these sites.

## 1.2 REPORT ORGANIZATION

This FSA is organized into four chapters. Chapter 1.0 presents the purpose of the FSA. Chapter 2.0 discusses environmental conditions at the site, Chapter 3.0 presents the remedial action objectives (RAOs), and finally, Chapter 4.0 presents and discusses revised RAOs.

## **2.0 ENVIRONMENTAL CONDITIONS**

Site 15 is 21 acres in size and is located along the southwestern facility boundary near the South Air Field. The site topography slopes at about five percent to the southwest towards Clear Creek, located approximately 1,200 feet (ft) southwest of the site. The Initial Assessment Study (IAS) report noted soil erosion had exposed numerous areas of buried waste [Envirodyne Engineers, Inc. (EE), 1985]. The approximate location of Site 15 is shown on Figure 2-1.

Site 15 was an operational landfill from 1965 to 1979 and consisted of approximately seven trenches oriented north-northeast. These trenches covered approximately 15 of the 21 acres of the site. The landfill reportedly received the majority of waste generated at NAS Whiting Field, potentially including general refuse, waste paints, oils, solvents, thinner, hydraulic fluid, bagged asbestos, and potentially polychlorinated Biphenyls (PCB)-contaminated transformer oil. It is estimated approximately 3,000 to 4,500 tons of waste were disposed at the site annually. Burning of waste material was not conducted, and waste was covered on a daily basis. At the time of the RI fieldwork, buried wastes were not typically exposed at the land surface, and there were no indications (e.g., stained soil or stressed vegetation) of other past waste disposal practices (HLA, 1999).

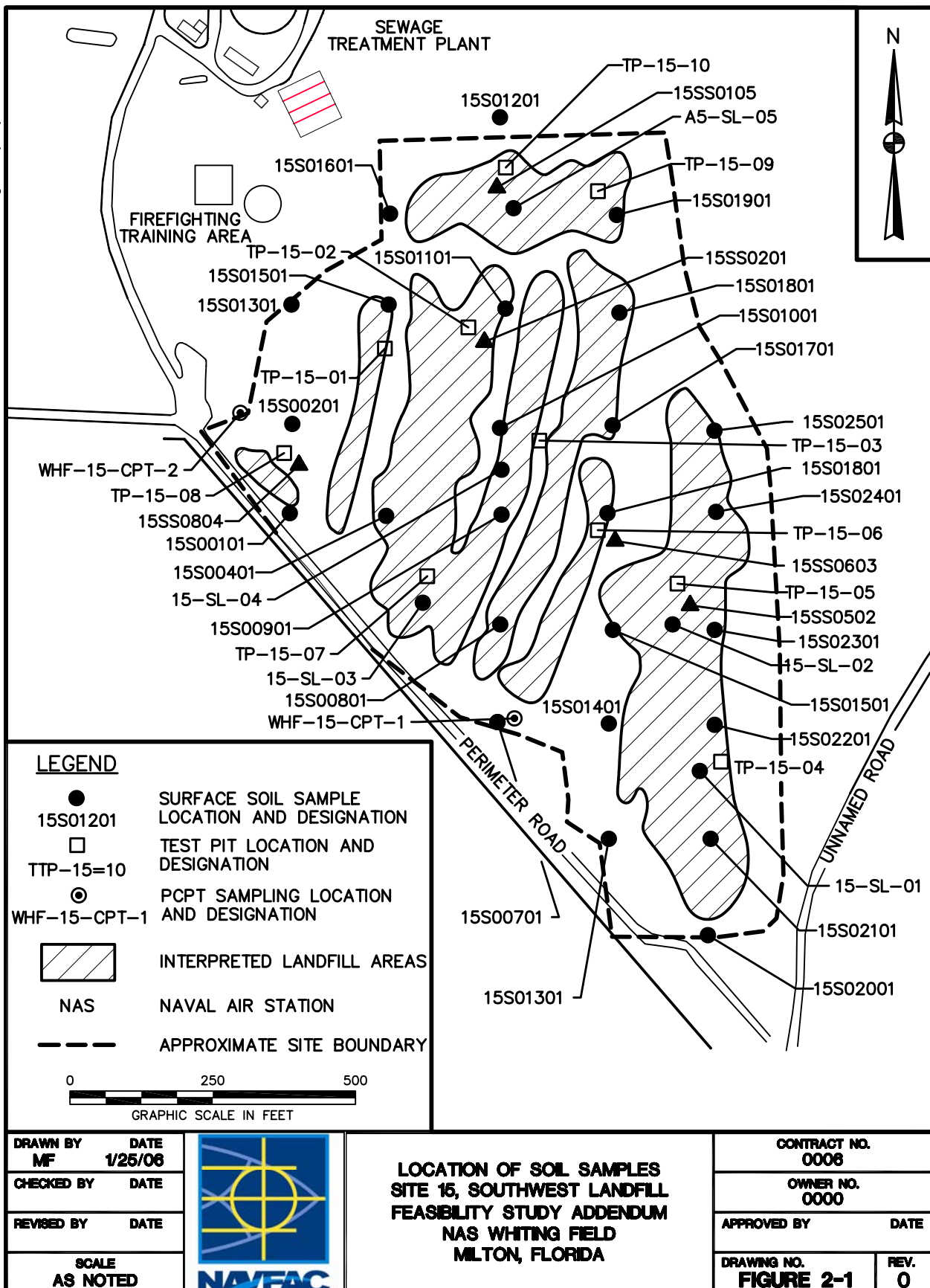
Currently, Site 15 consists of vacant, unused land covered with sparse native grasses and scrub oak vegetative cover and planted pine trees approximately 20 to 30 ft in height. There are no buildings at the site and no permanent surface water sources exist in the immediate vicinity of Site 15.

### **2.1 NATURE AND EXTENT OF CONTAMINATION**

Environmental conditions at Site 15 are described in detail in the RI Report issued in 1999 (HLA, 1999) and the FS in 2001 (HLA, 2001). Constituents detected in the surface soils include three volatile organic compounds (VOCs), three semi-volatile organic compounds (SVOCs), three pesticides, 20 inorganic constituents, and cyanide. Constituents detected in the subsurface soils include three VOCs, seven SVOCs, two pesticides/PCBs, 20 inorganic constituents, and cyanide. Surface and subsurface soil sample locations are presented on Figure 2-1.

### **2.2 REVISED HUMAN HEALTH RISK ASSESSMENT RESULTS**

This section presents the revised HHRA results using analytical data from surface and subsurface soils. This revised HHRA includes the changed conditions discussed in Section 1.0. The original HHRA was included in the RI Report (HLA, 1999).



The first step of the re-evaluation was to determine a revised list of COPCs. The re-evaluation will consider exposure to surface soil by hypothetical future residents. FDEP SCTLs and USEPA Region III RBCs were used to select COPCs in the original risk assessment. However, USEPA Region IV currently requires the use of USEPA Region IX PRGs to select COPCs, therefore, FDEP SCTLs and USEPA's Region IX PRGs were used in this analysis to select COPCs for this evaluation.

As discussed in Section 1.0, arsenic, aluminum, iron, manganese, and vanadium are not considered COPCs for Site 15 surface and subsurface soils; therefore, these inorganic constituents are not considered in this revised risk assessment. In addition, since the original risk assessment was prepared, the methodology for estimating risks resulting from dermal exposures to soil has changed. USEPA's Risk Assessment Guidance for Superfund (RAGS), Part E dermal guidance was used for this risk evaluation (USEPA, 2001).

For this revised HHRA, the exposure point concentration (EPC) was considered to be the maximum detected concentration (worst case condition).

The revised HHRA for Site 15 consists of the following steps:

- Selection of COPCs
- Exposure assessment
- Toxicity assessment
- Risk characterization

The risk screening for human health uses the FDEP SCTLs (FDEP, 2005) and the USEPA Region IX PRGs (USEPA, 2002) to conservatively assess exposure and toxicity.

### **2.2.1        Selection of Human Health COPCs**

#### **Surface Soils**

All 29 soil samples collected from 0 to 1 ft below land surface (bls) at Site 15 were evaluated for surface soil COPC selection. A comparison of the maximum detected surface soil concentrations to screening levels based on USEPA Region IX PRGs and FDEP SCTLs for residential exposures was conducted.

No constituents were detected in surface soils at concentrations in excess of the direct contact, risk based COPC screening levels and background concentrations and, therefore no COPCs were identified for surface soil at Site 15.

### **Subsurface Soils**

All five soil samples collected from 5 to 10 ft bls at Site 15 were evaluated for subsurface soil COPC selection. A comparison of the maximum detected subsurface soil concentrations to screening levels based on USEPA Region IX PRGs and FDEP SCTLs for residential exposures was conducted.

Aroclor-1242 and mercury were the only constituents detected at concentrations in excess of direct contact, risk based COPC screening levels and background concentrations, and therefore, were retained as COPCs for subsurface soil at Site 15. Concentrations of Aroclor-1242 exceeded the simple apportioned and non-apportioned PRGs and SCTLs. Concentrations of mercury exceeded the simple apportioned SCTL, but were less than the non-apportioned SCTL and PRG.

#### **2.2.2 Risk Characterization Summary**

This section provides a characterization of the human health risks associated with the potential exposures to constituents in subsurface soils at Site 15. Potential risks were estimated for five receptors (the hypothetical future resident, the typical industrial worker, the construction worker, the maintenance worker, and the recreational user/trespasser) using USEPA and proposed FDEP risk assessment guidance. The results of the risk characterization are discussed below.

No COPCs were retained for surface soil at Site 15; therefore, risks were only calculated for exposures to subsurface soil.

Cumulative Hazard Indices (HIs) for Aroclor-1242 and mercury estimated for exposures by residents to subsurface soil (HI = 2) exceeded 1.0. Aroclor-1242 [Hazard Quotient (HQ) = 2] was the major contributor to the HI; the HI for mercury was 0.2. Cumulative HIs for construction workers and industrial workers were less than 1.0, indicating adverse, non-carcinogenic effects are not anticipated for these receptors.

Cumulative Incremental Lifetime Cancer Risk (ILCRs) for exposures to subsurface soil were less than or within USEPA's target risk range of  $1 \times 10^{-4}$  to  $1 \times 10^{-6}$  for all receptors. However, the ILCR for residents hypothetically exposed to subsurface soil exceeded the FDEP target level of  $1 \times 10^{-6}$ . The chemical-specific ILCR for Aroclor-1242, the only carcinogen selected as a COPC, exceeded  $1 \times 10^{-6}$  for exposures to subsurface soil by residents.

The maximum detected Aroclor-1242 concentration [2.2 milligrams per kilograms (mg/kg)] exceeds the current SCTL for the residential land use scenario (0.5 mg/kg). Therefore, Aroclor-1242 was identified as a COC for subsurface soil under a residential land use scenario based on the risk characterization at Site 15. However, the maximum detected Aroclor-1242 concentration (2.2 mg/kg) does not exceed the SCTL for the industrial land use scenario (2.6 mg/kg) or the alternative SCTL for recreational land use (6.2 mg/kg). Therefore, Aroclor-1242 was not selected as a potential COC for the industrial or recreational land use scenarios.

### **2.2.3      Evaluation of Results**

No constituents were selected as COPCs for surface soil. Aroclor-1242 and mercury were selected as COPCs for subsurface soil, and quantitative risk estimates were calculated for five future receptors (the hypothetical future resident, the typical industrial worker, the construction worker, the maintenance worker, and the recreational user). The non-cancer risk estimates (i.e., HIs) for the hypothetical future resident exposed to subsurface soil exceeded 1.0 for Aroclor-1242 indicating a potential for adverse, non-carcinogenic health effects under the conditions established in the exposure assessment. The non-cancer risk estimates (i.e., HIs) for the typical industrial worker or the construction worker did not exceed 1.0. The cancer risk estimate developed for the future resident hypothetically exposed to Aroclor-1242 in subsurface soils exceeded the State of Florida cancer risk benchmark of  $1 \times 10^{-6}$ .

The risk assessment evaluated risks to a hypothetical future resident and a typical industrial worker using the published SCTLs for the residential and industrial land use scenarios, respectively. Additionally, risks to a hypothetical future recreational user were evaluated using SCTLs specifically developed for this risk assessment. No constituents were identified as potential COCs for surface soils based on a comparison of maximum detected concentrations and EPCs to these SCTLs. Aroclor-1242 was selected as a COC for subsurface soils based on the comparison of the maximum detected concentrations and EPC to the relevant residential and industrial SCTLs. The maximum detected Aroclor-1242 concentration (2.2 mg/kg) exceeds the current SCTL for a residential land use scenario (0.5 mg/kg), but does not exceed the SCTL for the industrial land use scenario (2.6 mg/kg). Aroclor-1242 was detected in only one of the five subsurface soil samples.

### 3.0 REMEDIAL ACTION OBJECTIVES

The RAOs presented in the original FS for Site 15 were:

RAO 1: Reduce risks associated with exposure to surface soil containing contaminant concentrations greater than action levels.

RAO 2: Reduce risks associated with exposure to subsurface soils containing Aroclor-1242 concentrations greater than action levels.

The RAOs for this site were based on the following criteria:

- Unacceptable human health risk for direct exposure to surface soil based on the site specific cleanup goal (CG) for arsenic.
- FDEP SCTLs (residential land use).
- USEPA Region III RBCs (residential land use).

Based on the changes discussed in Section 1.0 and current and potential future land use, the RAOs need to be revised for Site 15. The current and future use of the property at this site remains non-residential/recreational, and the current and future receptors are trespassers and recreational users.

Based on the current and future use receptors, two RAOs are applicable for Site 15.

RAO 1: To protect human health from carcinogenic and noncarcinogenic risks associated with incidental ingestion of, inhalation of, and dermal contact with contaminated soils (Aroclor-1242).

RAO 2: To comply with Federal and State Applicable or Relevant and Appropriate Requirements (ARARs) and To Be Considered (TBC) in accordance with accepted USEPA and FDEP guidelines.

The new RAOs for this site are based on the following criteria:

- Unacceptable human health risk exists for direct exposure to subsurface soil under a residential land use scenario at the site.
- FDEP SCTLs (residential land use)
- USEPA Region IX PRG (residential land use)



### **3.1 REVISED AND CLEANUP GOALS**

Cleanup Goals (CGs) establish acceptable exposure levels protective of human health and the environment. CGs are based on regulatory requirements, USEPA-acceptable risk levels, and assumptions regarding ultimate land uses, as well as contaminant pathways. Specifically, CGs are used to determine COCs, to estimate areas and volumes of impacted media and set performance standards for potential remedial alternatives.

CGs are determined based on ARARs and TBC criteria, constituents and media of interest, and exposure pathways. The CGs for this site are now formulated based on the following criteria: FDEP SCTLs for residential exposure [Chapter 62-777, Florida Administrative Code (F.A.C.)], and USEPA Region IX PRGs. The current and future use of the site is for non-residential/recreational purposes; therefore, the exposure pathways are trespassers and recreational users.

Cleanup of inorganic analytes below their established background concentrations will not be performed; therefore, background concentrations will be used as the lower limit for CGs. The CG selection process is summarized below.

The lower value of the FDEP SCTLs (Chapter 62-777, F.A.C.) and the USEPA Region IX PRGs for residential direct exposure will be used as CGs. Background concentration will be used as the lower limit for the CG of inorganic COCs. Table 3-1 provides a list of the revised surface and subsurface soil CGs for Site 15.

### **3.2 REVISED CONSTITUENTS OF CONCERN**

A re-evaluation of the constituents remaining in surface and subsurface soil was conducted in the revised HHRA. The RI identified three COCs, arsenic, vanadium, and Aroclor-1242 in surface and/or subsurface soil at Site 15. The revised HHRA identified only Aroclor-1242 and mercury (both in subsurface soil) as COPCs for soil at Site 15.

This was determined by comparing the soil CG value against the COPC's site-specific representative concentration (or maximum value if less than 10 samples). Any COPC with a site-specific representative concentration exceeding the CG becomes a COC. In summary, as shown in Table 3-2, Aroclor-1242 (in subsurface soil) is the only COC for soil at Site 15.

**TABLE 3-1**  
**DETERMINATION OF REVISED CLEANUP GOALS AT SITE 15**  
**NAS WHITING FIELD**  
**MILTON, FLORIDA**

Constituent of Potential Concern <sup>1</sup>	Units	62-777, F.A.C. Residential SCTL <sup>2</sup>	USEPA Region IX Residential PRGs <sup>3</sup>	Lower Value	Risk Driver <sup>4</sup>	Surface Soil Background	Surface Soil CG	Subsurface Soil Background	Subsurface Soil CG
Aroclor-1242	mg/kg	0.5	0.22	0.22	C	NA	NA	NA	0.22
Mercury	mg/kg	3	23	3	N	NA	NA	NA	3

<sup>1</sup> Combined list of all COPCs for Site 15.

<sup>2</sup> FDEP Soil Cleanup Target Levels (SCTLs) for Chapter 62-777, F.A.C., April 2005.

<sup>3</sup> USEPA Region IX Preliminary Remediation Goal (PRG) Table, October 2002. (note: 1/10<sup>th</sup> value used for non-carcinogens).

<sup>4</sup> Risk Driver Codes: N = Non-carcinogen, C = Carcinogen.

CG – Cleanup Goal

mg/kg – milligrams per kilogram

NA – Not Applicable

**TABLE 3-2  
REVISED CONSTITUENT OF CONCERN EVALUATION  
SUBSURFACE SOIL  
SITE 15**

**NAS WHITING FIELD  
MILTON, FLORIDA**

Constituent of Potential Concern	Units	Maximum Detected Concentration	Maximum Qualifier	Representative Concentration <sup>1</sup>			CG	COC
				Value	Statistic <sup>2</sup>	Rationale <sup>3</sup>		
Aroclor-1242	mg/kg	2.2	none	2.2	max	n<10	0.22	Yes <sup>4</sup>
Mercury	mg/kg	0.59	none	0.59	max	n<10	3	No

<sup>1</sup>For non-detects, 1/2 sample quantitation limit was used as a proxy concentration; for duplicate sample results, the average value was used in the calculation.

<sup>2</sup>Statistic: 95% (upper confidence limit) UCL of log-transformed data (95% UCL-T), 95% UCL of data (95% UCL-N). Maximum value used (max) since the sample size was <10 samples.

<sup>3</sup>Rationale

(1) The 95% UCL exceeded the maximum (n<10); therefore, the maximum was used.

<sup>4</sup>COC under residential use scenario only, not industrial.

mg/kg = milligrams per kilogram

CG = Cleanup goal

COC = Constituent of concern

### **3.3 REVISED AREAS AND VOLUMES OF SOIL REQUIRING REMEDIAL ACTION**

The estimated area and volume of soil with COCs exceeding CGs has changed significantly from the original FS. Appendix C of the original FS presents the area (21 acres) and volume (79,445 cubic yards) calculations for soil requiring remedial action under conditions at that time.

Due to the changes discussed in Section 1.0 and the reduced list of COCs, the revised area and volume of soil requiring remedial action or removal based on current conditions encompasses only the area around subsurface soil sample location 15SS0804 (Figure 2-1). This sample contained Aroclor-1242 at concentrations exceeding CGs. To account for an adequate buffer around and below the location, the area to be addressed consists of a 10 ft by 10 ft area to a depth of 12 ft bls (one ft below the depth of the sample collected at this location).

In summary, the estimated area and volume of soil requiring remedial action or removal at Site 15 is 100 square feet or 44 cubic yards.

## **4.0 AMENDED DESCRIPTION AND EVALUATION OF REMEDIAL ALTERNATIVES**

### **4.1 AMENDED DESCRIPTION OF ALTERNATIVES**

Identification and screening of appropriate remedial alternative technologies addressing the RAOs developed for Site 15 were presented in the FS. Each technology was then screened based on site- and waste-limiting characteristics. Three soil remedial alternatives were developed in the original FS representing a range of options for Site 15 (HLA, 2001). Table 4-1 shows a comparison between the soil remedial alternatives identified in the original FS and this FSA.

### **4.2 AMENDED EVALUATION OF ALTERNATIVES**

This section compares the impact of the changes in surface and subsurface soil COCs on the evaluation of the three remedial alternatives in accordance with the nine Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) criteria, as originally provided in the FS. A summary of this comparison is provided in Table 4-2.

#### **4.2.1 Overall Protection of Human Health and the Environment**

The changes discussed in Section 1.0 and the reduced list of COCs as determined by the revised HHRA for Site 15, do not result in a change in the relative overall protection of human health and the environment provided by Alternatives 1, 2, or 3. Alternative 1 remains unprotective of human health and the environment. Alternatives 2, and 3 remain protective of human health and the environment.

#### **4.2.2 Compliance with ARARs**

The change in COCs as determined by the revised HHRA for Site 15, do not result in a change in the compliance of Alternative 1, 2, or 3 with ARARs. There is no change in the compliance of Alternatives 1, 2, and 3 with constituent-, location-, and action-specific-ARARs.

#### **4.2.3 Long-Term Effectiveness and Permanence**

The change in COCs as determined by the revised HHRA for Site 15, do not impact the long-term effectiveness and permanence of Alternative 1, 2, or 3. Alternative 1 will not provide long-term effectiveness and permanence and Alternatives 2 and 3 will continue to provide long-term effectiveness and permanence.

**TABLE 4-1**  
**COMPARISON OF ORIGINAL FS AND FSA DESCRIPTION OF SOIL REMEDIAL ALTERNATIVES**  
**SITE 15, SOUTHWEST LANDFILL**  
**NAS WHITING FIELD**  
**MILTON, FLORIDA**

Alternative Number		Alternative Type		Representative Process Options Combined into Alternatives		Alternative Description	
FS (March 2001)	FSA (August 2006)	FS (March 2001)	FSA (August 2006)	FS (March 2001)	FSA (August 2006)	FS (March 2001)	FSA (August 2006)
Alternative 1 No Action	Alternative 1 No Action	No Action	No Action	None	None	<ul style="list-style-type: none"> <li>Five-year Reviews</li> </ul>	<ul style="list-style-type: none"> <li>No Action</li> </ul>
Alternative 2 LUCs	Alternative 2 LUCs	Limited Action – No or Minimal Treatment	Limited Action – No or Minimal Treatment	LUCs	LUCs	<ul style="list-style-type: none"> <li>LUCs including LUCAP and LUCIP</li> <li>Posting of warning signs</li> <li>Five-year site reviews</li> </ul>	<ul style="list-style-type: none"> <li>LUCs (<i>LUC RD will establish LUCs</i>)</li> <li>Posting of warning signs</li> <li>(<i>Five-year review will be part of LUC RD</i>)</li> </ul>
Alternative 3 Surface Soil Cover and LUCs	Alternative 3 Soil Cover and LUCs	Containment – Minimizes Long-Term Management	Containment – Minimizes Long-Term Management	LUCs, Containment	LUCs, Containment	<ul style="list-style-type: none"> <li>LUCs including LUCAP and LUCIP</li> <li>Establish vegetative cover</li> <li>Posting of warning signs</li> <li>Five-year site reviews</li> </ul>	<ul style="list-style-type: none"> <li>LUCs (<i>LUC RD will establish LUCs</i>)</li> <li>Posting of warning signs</li> <li>(<i>Five-year review will be part of LUC RD</i>)</li> </ul>

Notes:  
LUCs = Land Use Controls  
LUCIP = LUC Implementation Plan  
LUCAP = LUC Assurance Plan  
RD = Remedial Design  
FS = Feasibility Study  
FSA = Feasibility Study Addendum

TABLE 4-2

**SUMMARY OF COMPARATIVE IMPACT OF CHANGES IN COCs ON EVALUATION OF REMEDIAL ALTERNATIVES  
SITE 15 FS ADDENDUM**

**NAS WHITING FIELD  
MILTON, FLORIDA**

**PAGE 1 OF 2**

<b>CRITERIA</b>	<b>ALTERNATIVE 1 No Action</b>	<b>ALTERNATIVE 2 LUCs</b>	<b>ALTERNATIVE 3 Soil Cover and LUCs</b>
<b>THRESHOLD CRITERIA</b>			
<b>Overall Protection of Human Health and the Environment</b>			
Human Health Protection	No change	No change	No change
Environmental Protection	No change	No change	No change
<b>Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)</b>			
Compliance with Chemical-Specific ARARs	No change	No change	No change
Compliance with Action-Specific ARARs	No change	No change	No change
Compliance with Location-Specific ARARs	No change	No change	No change
Compliance with Other Criteria	No change	No change	No change
<b>BALANCING CRITERIA</b>			
<b>Long-Term Effectiveness and Permanence</b>			
Reduction in Residual Risk	No change	Decreased risk due to reduction of COCs	Decreased risk due to reduction of COCs
Long-Term Reliability of Controls	No change	No change	No change
Need for 5-Year Review	No change	No change	No change
Prevention of Exposure to Residuals	No change	No change	No change
Potential Need for Replacement of Technical Components after Remedial Objectives Are Achieved	No change	No change	No change
Long-Term Management	No change	No change	No change
<b>Reduction of Mobility, Toxicity, or Volume through Treatment</b>			
Amount Destroyed or Treated	No change	No change	Smaller area requiring soil cover due to reduction of COCs
Reduction in Mobility, Toxicity, or Volume	No change	No change	No change
Irreversibility of Treatment	No change	No change	No change
Type and Quantity of Residuals Remaining after Treatment	No change	Decreased due to reduction of COCs	Decreased due to reduction of COCs

TABLE 4-2

SUMMARY OF COMPARATIVE IMPACT OF CHANGES IN COCs ON EVALUATION OF REMEDIAL ALTERNATIVES  
SITE 15 FS ADDENDUM

NAS WHITING FIELD  
MILTON, FLORIDA

PAGE 2 OF 2

CRITERIA	ALTERNATIVE 1 No Action	ALTERNATIVE 2 LUCs	ALTERNATIVE 3 Soil Cover and LUCs
<b>Short-Term Effectiveness</b>			
Community Protection During Implementation	No change	No change	No change
Worker Protection During Implementation	No change	No change	No change
Environmental Impacts	No change	No change	No change
Construction Time	No change	No change	4 months (decrease)
Time Until RAOs and CGs are Achieved	No change	No change	No change
<b>Implementability</b>			
Ability to Construct and Operate the Technology	No change	No change	No change
Reliability of Technology	No change	No change	No change
Ease of Undertaking Additional Remedial Action, if Required	No change	No change	No change
Ability to Monitor Effectiveness	No change	No change	No change
Permitting Requirements	No change	No change	No change
Coordination with Other Agencies	No change	No change	No change
Availability of Services and Capabilities	No change	No change	No change
Availability of Equipment, Specialists, and Materials	No change	No change	No change
<b>Cost<sup>a</sup></b>			
Capital Costs	No change	\$32,134 (decrease)	\$1,716,552 (decrease)
Short-Term O&M	No change	No change	\$248,288 (decrease)
Long-Term O&M			
5-Year Review	a	No change	No change
Land-Use Controls	No change	No change	No change
Total Project Present Worth Cost	No change \$0 (Total)	\$32,134 (decrease) \$102,909 (Total)	\$1,964,840 (decrease) \$162,146 (Total)
<b>State Acceptance</b>			
FDEP Review and Comment	No change	No change	No change
<b>Community Acceptance</b>			
Public Review and Comment	No change	No change	No change

NOTES:

ARAR Applicable or relevant and appropriate requirement  
COC Constituent of concern  
LUC Land use control  
RAO Remedial action objective  
CG Cleanup goals

<sup>a</sup>The original FS included costs for 5 year review; however the 5-year reviews are not included for the No Action Alternative in this re-evaluation a 5-year reviews are not required for NFAs.



#### **4.2.4            Reduction of Mobility, Toxicity, or Volume through Treatment**

The change in COCs does not impact Alternative 1. Alternative 1 does not provide reduction of mobility, toxicity, or volume because there is no action. The reduced list of COCs also does not impact the reduction of mobility, toxicity or volume provided by Alternatives 2 and 3.

#### **4.2.5            Short-Term Effectiveness**

The change in COCs does not impact Alternative 1. Alternative 1 will not provide short-term effectiveness because there is no action. Alternatives 2 and 3 would still provide short-term effectiveness.

#### **4.2.6            Implementability**

The change in COCs has no impact on the implementability of any of the three alternatives.

#### **4.2.7            Cost**

The change/reduced list of COCs does have an impact on the costs for Alternatives 2 and 3 resulting in a reduction in costs from the original FS cost estimates for these alternatives. The decrease in capital costs for Alternative 3 is due to the decrease in impacted soil area and volume. Table 4-2 shows the amount of decreased cost for Alternatives 2 and 3. The net present worth (NPW) cost estimates for Alternatives 2 and 3 are detailed in Appendix A. There would be no cost for Alternative 1.

#### **4.2.8            State Acceptance**

The FDEP reviewed and commented on the Draft FSA for Site 15 prior to final approval and subsequent acceptance. The FDEP comments have been addressed in this Final FSA for Site 15.

#### **4.2.9            Community Acceptance**

The information concerning community acceptance will be addressed following public comment on the Proposed Plan for Site 15 in the responsiveness summary to be included in the Record of Decision (ROD) for Site 15.

### **4.3                EVALUATION SUMMARY**

As discussed in the above sections and further illustrated on Table 4-2, recent changes and developments at Site 15 have had some impact on the findings of the original FS. In particular, the reduced costs to implement Alternative 3 for Site 15 subsurface soils. The remedial alternatives and their comparative evaluation as presented in this FSA are somewhat different from those presented in the original FS.

## REFERENCES

ABB Environmental Services, Inc. (ABB-ES), 1998, *General Information Report, Naval Air Station Whiting Field, Milton, Florida*. Prepared for Southern Division Naval Facilities Engineering Command, North Charleston, South Carolina. January.

Florida Department of Environmental Protection (FDEP), 2005. *Soil Cleanup Target Levels, F.A.C. 62-777*. Final Report. April.

FDEP, 2001. Letter from James Cason, FDEP, to James Holland, NAS Whiting Field. *Analysis of Soil for Arsenic at Outlying Landing Fields*. April 11.

Envirodyne Engineering, 1985. *Initial Assessment Study, Naval Air Station Whiting Field, Milton, Florida*. Prepared for Southern Division Naval Facilities Engineering Command, N Charleston, SC. 1985.

Harding Lawson and Associates (HLA) 1999. *Remedial Investigation, Site 15, Southwest Landfill, Naval Air Station Whiting Field, Milton, Florida*. Prepared for Southern Division Naval Facilities Engineering Command, North Charleston, South Carolina. December 1999.

HLA, 2001. *Feasibility Study Site 15, Southwest Landfill, Naval Air Station Whiting Field, Milton, Florida*. Prepared for Southern Division Naval Facilities Engineering Command, North Charleston, South Carolina. March.

Tetra Tech NUS (TtNUS), 2004. *Risk Assessment Re-evaluation of Soils at Sites 9, 10, 11, 12, 13, 14, 15, 16, 17, and 18, Naval Air Station Whiting Field, Milton, Florida*. Prepared for Southern Division Naval Facilities Engineering Command, North Charleston, South Carolina. October.

TtNUS, 2005. Technical Memorandum from Larry Smith. *Inorganics in Soil at NAS Whiting Field, Naval Air Station Whiting Field, Milton, Florida*. April.

United States Environmental Protection Agency (USEPA), 2001. *Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual- (Part E, Supplemental Guidance for Dermal Risk Assessment) Interim Guidance*, Office of Emergency and Remedial Response, Washington, D.C.

USEPA, 2002. *Region IX PRGs Table 2002 Update*. USEPA Region IX, San Francisco, California. October 1.

## **APPENDIX A**

NAVAL AIR STATION WHITING FIELD  
MILTON, FLORIDA  
SITE 15  
SOIL ALTERNATIVE 2: LAND USE CONTROLS  
CAPITAL COSTS

Cost Item	Quantity	Unit	Subcontract	Unit Cost Material	Labor	Equipment	Subcontract	Extended Cost Material	Labor	Equipment	Subtotal
<b>1 PROJECT PLANNING</b>											
1.1 Prepare Remedial Design (Engineer)	40	hr			\$26.44		\$0	\$0	\$1,058	\$0	\$1,058
1.2 Project Scheduling and Procurement (Project Manager)	8	hr			\$40.12		\$0	\$0	\$321	\$0	\$321
<b>2 MOBILIZATION/DEMOBILIZATION</b>											
2.1 Equipment Mob/Demob (Exc. & Dozier)	0	ea			\$200.00	\$250.00	\$0	\$0	\$0	\$0	\$0
2.2 Mobilize/Demobilize Personnel (2-persons)	0	ea		\$375.00	\$300.00		\$0	\$0	\$0	\$0	\$0
<b>3 DECONTAMINATION</b>											
3.1 Temporary Decon Pad	0	ls		\$250.00	\$200.00	\$75.00	\$0	\$0	\$0	\$0	\$0
3.2 Decon Water Disposal	0	drum	\$125.00				\$0	\$0	\$0	\$0	\$0
3.3 Decon Water Storage Drums	0	ea		\$45.00			\$0	\$0	\$0	\$0	\$0
3.4 PPE (2 p * 2 days)	0	m-day		\$30.00			\$0	\$0	\$0	\$0	\$0
3.5 Decontaminate Equipment (Pressure Washer)	0	ea			\$134.45	\$50.00	\$0	\$0	\$0	\$0	\$0
<b>4 SITE PREPARATION</b>											
4.1 Erosion Control Fencing	0	lf		\$0.23	\$1.17		\$0	\$0	\$0	\$0	\$0
4.2 Collect/Analyze Delineation Samples (TPH)	0	ea	\$200.00	\$10.00	\$22.24		\$0	\$0	\$0	\$0	\$0
4.3 Construction Surveys (2-man crew)	0	day	\$648.36				\$0	\$0	\$0	\$0	\$0
4.4 Utility Location and Site Delineation/Layout	0	hrs			\$26.44		\$0	\$0	\$0	\$0	\$0
<b>5 EXCAVATION/BACKFILL</b>											
5.1 Excavate/Load Contaminated Soil (1.0 cy Hyd. Excavator)	0.00	cy			\$1.27	\$2.23	\$0	\$0	\$0	\$0	\$0
5.2 Standby, Crawler Mounted 1.0 CY Hydraulic Excavator	0	hrs				\$20.50	\$0	\$0	\$0	\$0	\$0
5.3 Health & Safety Monitoring with OVA during Excavation	0	day			\$188.16	\$100.00	\$0	\$0	\$0	\$0	\$0
5.4 Collect/Analyze Confirmatory Samples	0	ea	\$200.00	\$10.00	\$22.24		\$0	\$0	\$0	\$0	\$0
5.5 Import (Offsite) Place, Compact Clean Fill Material	0.00	cy		\$7.82	\$0.85	\$1.81	\$0	\$0	\$0	\$0	\$0
5.6 UST Removal	0	ea		\$340.72	\$485.04	\$1,638.12	\$0	\$0	\$0	\$0	\$0
<b>6 OFF-SITE TRANSPORTATION/DISPOSAL</b>											
6.1 Waste Profile	0	ls	\$750.00				\$0	\$0	\$0	\$0	\$0
6.2 Transport and Dispose of Soil (Non-hazard.) in Landfil	0.00	ton	\$45.00				\$0	\$0	\$0	\$0	\$0
6.3 Prepare Shipment Manifests	0	hrs			\$26.44		\$0	\$0	\$0	\$0	\$0
<b>7 SITE RESTORATION</b>											
7.1 Import Vegetative Cover Material (Topsoil)	0.00	cy		\$15.00			\$0	\$0	\$0	\$0	\$0
7.2 Place/Grade Topsoil (6")	0	day			\$227.20	\$435.00	\$0	\$0	\$0	\$0	\$0
7.3 Sod Disturbed Area	0.0000	acre	\$20,859.00				\$0	\$0	\$0	\$0	\$0
<b>8 LAND USE CONTROLS</b>											
8.1 Site Survey (2-man crew)	2	days	\$700.00				\$1,400	\$0	\$0	\$0	\$1,400
8.2 Survey Plat	1	ls	\$3,000.00				\$3,000	\$0	\$0	\$0	\$3,000
8.3 Prepare Land Use Control Implementation Plan/Docs (Engineer)	100	hours			\$26.44		\$0	\$0	\$2,644	\$0	\$2,644
8.4 Modify Master Plan and Prepare Deed Restrictions (Eng/PM)	80	hours			\$40.12		\$0	\$0	\$3,210	\$0	\$3,210
<b>Subtotal Direct Capital Costs less Subcontract</b>								\$0	\$7,232	\$0	\$7,232
<b>Local Area Adjustment</b>								84%	84%	84%	
								\$0	\$6,075	\$0	\$6,075
Overhead on Labor Cost @ 30%									\$1,823		\$1,823
G & A on Labor Cost @ 10%									\$608		\$608
G & A on Material Cost @ 10%								\$0			\$0
<b>Total Direct Capital Cost</b>								\$0	\$8,505	\$0	\$8,505

NAVAL AIR STATION WHITING FIELD  
MILTON, FLORIDA  
SITE 15  
SOIL ALTERNATIVE 2: LAND USE CONTROLS  
CAPITAL COSTS

Cost Item	Quantity	Unit	Subcontract	Unit Cost Material	Labor	Equipment	Subcontract	Extended Cost Material	Labor	Equipment	Subtotal
Indirects on Total Direct Labor Cost @ 75%								\$6,379			\$6,379
Profit on Total Direct Cost @ 10%											\$851
<b>Subtotal</b>											\$15,734
Health & Safety Monitoring @ 3%			(Includes Subcontractor cost)								\$604
<b>Total Field Cost</b>											<b>\$16,338</b>
Subtotal Subcontractor Cost							\$4,400				\$4,400
G & A on Subcontract Cost @ 10%							\$440				\$440
Profit on Subcontractor Cost @ 5%											\$220
<b>Subcontractor Cost</b>											<b>\$5,060</b>
Contingency on Total Field and Subcontractor Costs @ 10%											\$2,140
Engineering on Total Field and Subcontractor Costs @ 5%											\$1,070
<b>TOTAL Capital COST</b>											<b>\$24,608</b>

NAVAL AIR STATION WHITING FIELD  
MILTON, FLORIDA  
SITE 15  
SOIL ALTERNATIVE 2: LAND USE CONTROL:  
ANNUAL COSTS

Cost Item	Quantity	Unit	Unit Cost	Labor Overhead <sup>a</sup>	Total Cost
<b>1 FIVE YEAR SITE REVIEWS (FOR 30 YEAR PERIOD)</b>					
1.1 Site Review Meeting (2-persons for 2-days)					
Project Manager	16	hr	\$40.12	\$40.12	\$1,284
Staff Engineer	16	hr	\$26.44	\$26.44	\$846
ODCs (travel, etc.)	1	ls	\$400.00		\$400
1.2 Five Year Review Report					
Project Manager	8	hr	\$40.12	\$40.12	\$642
Staff Engineer	32	hr	\$26.44	\$26.44	\$1,692
ODCs (photocopies, telephone, etc.)	1	ls	\$250.00		\$250
Subtotal Five Year Review Cos					\$5,114
G&A and Profit @ 15%					\$767
Subtotal					\$5,881
Contingency @ 10%					\$588.11
<b>Total Five Year Review Cost</b>					<b>\$6,469</b>
<b>2 LAND USE CONTROL MONITORING (FOR 30 YEAR PERIOD)</b>					
2.1 Quarterly Site Inspections					
Project Manager (2 hrs for each Inspection)	8	hr	\$40.12	\$40.12	\$642
Staff Engineer	32	hr	\$26.44	\$26.44	\$1,692
2.2 Annual Review and Report					
Project Manager	4	hr	\$40.12	\$40.12	\$321
Staff Engineer	12	hr	\$26.44	\$26.44	\$635
ODCs (photocopies, telephone, etc.)	1	ls	\$250.00		\$250
2.3 Sign/Fence Maintenance	1	ls	\$50.00		\$50
Subtotal Land Use Control Monitoring					\$3,590
G&A and Profit @ 15%					\$538
Subtotal					\$4,128
Contingency @ 10%					\$412.80
<b>Total Land Use Control Monitoring Cos</b>					<b>\$4,541</b>

<sup>a</sup> Overhead on professional labor @ 100%

**NAVAL AIR STATION WHITING FIELD**  
**MILTON, FLORIDA**  
**SITE 15**  
**SOIL ALTERNATIVE 2: LAND USE CONTROLS**  
**PRESENT WORTH ANALYSIS**

Year	Capital Cost	Operation and Maintenance Cost	Annual Cost	Total Yearly Cost	Present-Worth Factor (i = 6%)	Present Worth
0	\$24,608			\$24,608	1.000	\$24,608
1		\$0	\$4,541	\$4,541	0.943	\$4,284
2		\$0	\$4,541	\$4,541	0.890	\$4,041
3		\$0	\$4,541	\$4,541	0.840	\$3,813
4		\$0	\$4,541	\$4,541	0.792	\$3,597
5		\$0	\$11,010	\$11,010	0.747	\$8,227
6		\$0	\$4,541	\$4,541	0.705	\$3,201
7		\$0	\$4,541	\$4,541	0.665	\$3,020
8		\$0	\$4,541	\$4,541	0.627	\$2,849
9		\$0	\$4,541	\$4,541	0.592	\$2,688
10		\$0	\$11,010	\$11,010	0.558	\$6,148
11		\$0	\$4,541	\$4,541	0.527	\$2,392
12		\$0	\$4,541	\$4,541	0.497	\$2,257
13		\$0	\$4,541	\$4,541	0.469	\$2,129
14		\$0	\$4,541	\$4,541	0.442	\$2,008
15		\$0	\$11,010	\$11,010	0.417	\$4,594
16		\$0	\$4,541	\$4,541	0.394	\$1,787
17		\$0	\$4,541	\$4,541	0.371	\$1,686
18		\$0	\$4,541	\$4,541	0.350	\$1,591
19		\$0	\$4,541	\$4,541	0.331	\$1,501
20		\$0	\$11,010	\$11,010	0.312	\$3,433
21		\$0	\$4,541	\$4,541	0.294	\$1,336
22		\$0	\$4,541	\$4,541	0.278	\$1,260
23		\$0	\$4,541	\$4,541	0.262	\$1,189
24		\$0	\$4,541	\$4,541	0.247	\$1,121
25		\$0	\$11,010	\$11,010	0.233	\$2,565
26		\$0	\$4,541	\$4,541	0.220	\$998
27		\$0	\$4,541	\$4,541	0.207	\$942
28		\$0	\$4,541	\$4,541	0.196	\$888
29		\$0	\$4,541	\$4,541	0.185	\$838
30		\$0	\$11,010	\$11,010	0.174	\$1,917
<b>TOTAL PRESENT WORTH</b>						<b>\$102,909</b>

**NAVAL AIR STATION WHITING FIELD**  
**MILTON, FLORIDA**  
**SITE 15**  
**SOIL ALTERNATIVE 3: SOIL COVER AND LUCs**  
**ANNUAL COSTS**

Cost Item	Quantity	Unit	Unit Cost	Labor Overhead <sup>a</sup>	Total Cost
<b>1 FIVE YEAR SITE REVIEWS (FOR 30 YEAR PERIOD)</b>					
1.1 Site Review Meeting (2-persons for 2-days)					
Project Manager	16	hr	\$40.12	\$40.12	\$1,284
Staff Engineer	16	hr	\$26.44	\$26.44	\$846
ODCs (travel, etc.)	1	ls	\$400.00		\$400
1.2 Five Year Review Report					
Project Manager	8	hr	\$40.12	\$40.12	\$642
Staff Engineer	32	hr	\$26.44	\$26.44	\$1,692
ODCs (photocopies, telephone, etc.)	1	ls	\$250.00		\$250
Subtotal Five Year Review Cos					\$5,114
G&A and Profit @ 15%					\$767
Subtotal					\$5,881
Contingency @ 10%					\$588.11
<b>Total Five Year Review Cost</b>					<b>\$6,469</b>
<b>2 LAND USE CONTROL MONITORING (FOR 30 YEAR PERIOD)</b>					
2.1 Quarterly Site Inspections					
Project Manager (2 hrs for each Inspection)	8	hr	\$40.12	\$40.12	\$642
Staff Engineer	32	hr	\$26.44	\$26.44	\$1,692
2.2 Annual Review and Repor					
Project Manager	4	hr	\$40.12	\$40.12	\$321
Staff Engineer	12	hr	\$26.44	\$26.44	\$635
ODCs (photocopies, telephone, etc.)	1	ls	\$250.00		\$250
2.3 Sign/Fence Maintenance	1	ls	\$50.00		\$50
Subtotal Land Use Control Monitoring					\$3,590
G&A and Profit @ 15%					\$538
Subtotal					\$4,128
Contingency @ 10%					\$412.80
<b>Total Land Use Control Monitoring Cost</b>					<b>\$4,541</b>

<sup>a</sup> Overhead on professional labor @ 100%



NAVAL AIR STATION WHITING FIELD  
MILTON, FLORIDA  
SITE 15  
SOIL ALTERNATIVE 3: SOIL COVER AND LUCs  
CAPITAL COSTS

Cost Item	Quantity	Unit	Subcontract	Unit Cost Material	Labor	Equipment	Subcontract	Extended Cost Material	Labor	Equipment	Subtotal
<b>1 PROJECT PLANNING</b>											
1.1 Prepare Remedial Design (Engineer)	120	hr			\$26.44		\$0	\$0	\$3,173	\$0	\$3,173
1.2 Project Scheduling and Procurement (Project Manager/TEX)	40	hr			\$40.12		\$0	\$0	\$1,605	\$0	\$1,605
<b>2 MOBILIZATION/DEMobilIZATION</b>											
2.1 Equipment Mob/Demob (Exc., Loader, & Dozier)	2	ea			\$300.00	\$350.00	\$0	\$0	\$600	\$700	\$1,300
2.2 Mobilize/Demobilize Personnel (3-persons)	2	ea		\$400.00	\$350.00		\$0	\$800	\$700	\$0	\$1,500
2.3 Portable Toilet	1	mo	\$74.18				\$74	\$0	\$0	\$0	\$74
2.4 Storage Trailer (28' x 10')	1	mo	\$98.33				\$98	\$0	\$0	\$0	\$98
2.5 Office Trailer (32' x 8')	0	mo	\$221.49				\$0	\$0	\$0	\$0	\$0
2.6 Site Utilities	0	mo	\$1,500.00				\$0	\$0	\$0	\$0	\$0
<b>3 DECONTAMINATION</b>											
3.1 Temporary Decon Pad	1	ls		\$450.00	\$400.00	\$155.00	\$0	\$450	\$400	\$155	\$1,005
3.2 Decon Water Disposal	5	drum	\$150.00				\$750	\$0	\$0	\$0	\$750
3.3 Decon Water Storage Drums	5	ea		\$45.00			\$0	\$225	\$0	\$0	\$225
3.4 PPE (3 p * 5 days * 2 Weeks)	30	m-day		\$30.00			\$0	\$900	\$0	\$0	\$900
3.5 Decontaminate Equipment (Pressure Washer)	3	ea			\$134.45	\$50.00	\$0	\$0	\$403	\$150	\$553
<b>4 SITE PREPARATION</b>											
4.1 Erosion Control Fencing	144	lf		\$5.00			\$0	\$720	\$0	\$0	\$720
4.2 Signs	8	ea	\$75.00				\$600	\$0	\$0	\$0	\$600
4.3 Construction Surveys (2-man crew)	2	day	\$648.36				\$1,297	\$0	\$0	\$0	\$1,297
4.4 Utility Location and Site Delineation/Layout	2	hrs			\$33.23		\$0	\$0	\$66	\$0	\$66
4.5 Backhoe and Operator	7	day	\$1,500.00				\$10,500	\$0	\$0	\$0	\$10,500
4.6 Frontend Loader and Operator	7	day	\$900.00				\$6,300	\$0	\$0	\$0	\$6,300
4.7 Concrete Debris Disposal	0	cy	\$20.70				\$0	\$0	\$0	\$0	\$0
<b>5 EXCAVATION/BACKFILL</b>											
5.1 Excavate/Load Contaminated Soil (2.0 cy Hyd. Exc.	0	cy			\$0.68	\$1.71	\$0	\$0	\$0	\$0	\$0
5.2 Standby, Crawler Mounted 2.0 CY Hydraulic Excavato	0	hrs				\$37.54	\$0	\$0	\$0	\$0	\$0
5.3 Wheel Loader, 3 cy	0	hrs			\$27.20	\$56.31	\$0	\$0	\$0	\$0	\$0
5.4 Standby, Wheel Loader, 3 cy	0	hrs				\$14.07	\$0	\$0	\$0	\$0	\$0
5.5 Health & Safety Monitoring with OVA during Construction	10	day			\$188.16	\$100.00	\$0	\$0	\$1,882	\$1,000	\$2,882
5.6 Collect/Analyze Confirmatory Samples	0	ea	\$200.00	\$10.00	\$23.52		\$0	\$0	\$0	\$0	\$0
5.7 Import (Offsite) Place, Compact Clean Fill Materia	50	cy		\$12.00	\$0.85	\$1.81	\$0	\$600	\$43	\$91	\$733
5.8 Backfill with Clean Excavated Materia	0	cy		\$0.28	\$2.02	\$0.76	\$0	\$0	\$0	\$0	\$0
5.9 UST Removal	0	ea		\$340.72	\$485.04	\$1,638.12	\$0	\$0	\$0	\$0	\$0
<b>6 OFF-SITE TRANSPORTATION/ DISPOSAL</b>											
6.1 Waste Profile	0	ls	\$750.00				\$0	\$0	\$0	\$0	\$0
6.2 Transport and Dispose of Soil (Non-haz.) in Landfil	0	ton	\$45.00				\$0	\$0	\$0	\$0	\$0
6.3 Prepare Shipment Manifests	0	hrs			\$33.23		\$0	\$0	\$0	\$0	\$0
<b>7 SITE RESTORATION</b>											
7.1 Soil Cover	1200	sf	\$4.03				\$4,836	\$0	\$0	\$0	\$4,836
<b>8 LAND USE CONTROLS</b>											
8.1 Site Survey (2-man crew)	2	days	\$700.00				\$1,400	\$0	\$0	\$0	\$1,400
8.2 Survey Plat	1	ls	\$3,000.00				\$3,000	\$0	\$0	\$0	\$3,000
8.3 Prepare Land Use Control Implementation Plan/Docs (Engi	100	hours			\$26.44		\$0	\$0	\$2,644	\$0	\$2,644
8.4 Modify Master Plan and Prepare Deed Restrictions (Eng/PN	80	hours			\$40.12		\$0	\$0	\$3,210	\$0	\$3,210
<b>Subtotal Direct Capital Costs less Subcontract</b>								\$3,695	\$14,725	\$2,096	\$20,516

NAVAL AIR STATION WHITING FIELD  
MILTON, FLORIDA  
SITE 15  
SOIL ALTERNATIVE 3: SOIL COVER AND LUCs  
CAPITAL COSTS

Cost Item	Quantity	Unit	Subcontract	Unit Cost Material	Labor	Equipment	Subcontract	Extended Cost Material	Labor	Equipment	Subtotal
<b>Local Area Adjustment</b>								84%	84%	84%	
								\$3,104	\$12,369	\$1,760	\$17,233
Overhead on Labor Cost @ 30%									\$3,711		\$3,711
G & A on Labor Cost @ 10%									\$1,237		\$1,237
G & A on Material Cost @ 10%								\$310			\$310
<b>Total Direct Capital Cost</b>								\$3,414	\$17,317	\$1,760	\$22,491
Indirects on Total Direct Labor Cost @ 75%									\$12,988		\$12,988
Profit on Total Direct Cost @ 10%											\$2,249
<b>Subtotal</b>											\$37,728
Health & Safety Monitoring @ 3%			(Includes Subcontractor cost)								\$1,997
<b>Total Field Cost</b>											<b>\$39,725</b>
Subtotal Subcontractor Cost							\$28,855				\$28,855
G & A on Subcontract Cost @ 10%							\$2,886				\$2,886
Profit on Subcontractor Cost @ 5%											\$1,443
<b>Subcontractor Cost</b>											<b>\$33,184</b>
Contingency on Total Field and Subcontractor Costs @ 10%											<b>\$7,291</b>
Engineering on Total Field and Subcontractor Costs @ 5%											<b>\$3,645</b>
<b>TOTAL Capital COST</b>											<b>\$83,845</b>

**NAVAL AIR STATION WHITING FIELD**  
**MILTON, FLORIDA**  
**SITE 15**  
**SOIL ALTERNATIVE 3: SOIL COVER AND LUCs**  
**PRESENT WORTH ANALYSIS**

Year	Capital Cost	Operation and Maintenance Cost	Annual Cost	Total Yearly Cost	Present-Worth Factor (i = 6%)	Present Worth
0	\$83,845			\$83,845	1.000	\$83,845
1		\$0	\$4,541	\$4,541	0.943	\$4,284
2		\$0	\$4,541	\$4,541	0.890	\$4,041
3		\$0	\$4,541	\$4,541	0.840	\$3,813
4		\$0	\$4,541	\$4,541	0.792	\$3,597
5		\$0	\$11,010	\$11,010	0.747	\$8,227
6		\$0	\$4,541	\$4,541	0.705	\$3,201
7		\$0	\$4,541	\$4,541	0.665	\$3,020
8		\$0	\$4,541	\$4,541	0.627	\$2,849
9		\$0	\$4,541	\$4,541	0.592	\$2,688
10		\$0	\$11,010	\$11,010	0.558	\$6,148
11		\$0	\$4,541	\$4,541	0.527	\$2,392
12		\$0	\$4,541	\$4,541	0.497	\$2,257
13		\$0	\$4,541	\$4,541	0.469	\$2,129
14		\$0	\$4,541	\$4,541	0.442	\$2,008
15		\$0	\$11,010	\$11,010	0.417	\$4,594
16		\$0	\$4,541	\$4,541	0.394	\$1,787
17		\$0	\$4,541	\$4,541	0.371	\$1,686
18		\$0	\$4,541	\$4,541	0.350	\$1,591
19		\$0	\$4,541	\$4,541	0.331	\$1,501
20		\$0	\$11,010	\$11,010	0.312	\$3,433
21		\$0	\$4,541	\$4,541	0.294	\$1,336
22		\$0	\$4,541	\$4,541	0.278	\$1,260
23		\$0	\$4,541	\$4,541	0.262	\$1,189
24		\$0	\$4,541	\$4,541	0.247	\$1,121
25		\$0	\$11,010	\$11,010	0.233	\$2,565
26		\$0	\$4,541	\$4,541	0.220	\$998
27		\$0	\$4,541	\$4,541	0.207	\$942
28		\$0	\$4,541	\$4,541	0.196	\$888
29		\$0	\$4,541	\$4,541	0.185	\$838
30		\$0	\$11,010	\$11,010	0.174	\$1,917
<b>TOTAL PRESENT WORTH</b>						<b>\$162,146</b>